

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A ring resonator comprising:
a ring waveguide of a first relative refractive index difference, the ring waveguide having a narrow part; and
an optical waveguide of a second relative refractive index difference smaller than the first relative refractive index difference, the optical waveguide disposed adjacent to the narrow part to optically couple with the narrow part.
2. (Original) The ring resonator of claim 1 wherein the second relative refractive index difference is set to any of 0.3% to 0.75%.
3. (Currently Amended) The ring resonator of claim 1 wherein the ring waveguide further comprises tapered parts in which [[the]] waveguide width gradually narrows and extends before and after the narrow part respectively.
4. (Currently Amended) A ring resonator comprising:
a ring waveguide of a first relative refractive index difference, the ring waveguide having first and second narrow parts;
a first optical waveguide of a second relative refractive index difference smaller than the first relative refractive index difference, the first optical waveguide disposed adjacent to the first narrow part to optically couple with the first narrow part; and

a second optical waveguide of a third relative refractive index difference smaller than the first relative refractive index difference, the second optical waveguide disposed adjacent to the second narrow part to optically couple with the second narrow part.

5. (Original) The ring resonator of claim 4 wherein each of the second and third relative refractive index differences is set to any of 0.3% to 0.75%.

6. (Currently Amended) The ring resonator of claim 4 wherein the second relative refractive index difference is substantially identical approximately equal to the third relative refractive index difference.

7. (Currently Amended) The ring resonator of claim 4 wherein the ring waveguide further comprises a first pair of tapered parts in which [[the]] waveguide width gradually narrows and extends varies in the first pair of tapered parts coupled before and after the first narrow part ~~respectively~~ and a second pair of tapered parts in which the waveguide width gradually extends and narrows varies in the second pair of tapered parts coupled before and after the second narrow part ~~respectively~~.

8. (New) The ring resonator of claim 1 wherein the first relative refractive index difference is about 2.3%.

9. (New) The ring resonator of claim 1 wherein the narrow part of the ring waveguide has a first propagation constant and the optical waveguide has a second propagation constant and where the first propagation constant of the narrow part of the ring waveguide is approximately equal to the second propagation constant of the optical waveguide.

10. (New) The ring resonator of claim 1 wherein the optical waveguide comprises a curved portion and wherein the curved portion of the optical waveguide is disposed adjacent to the narrow part of the ring waveguide to optically couple with the narrow part.

11. (New) A ring resonator comprising:

a ring waveguide formed from first materials having a first relative refractive index difference between the first materials, a first portion of the ring waveguide having a first waveguide width and a second portion of the ring waveguide having a second waveguide width, the second waveguide width being less than the first waveguide width; and

an optical waveguide formed from second materials having a second relative refractive index difference between the second materials, the second relative refractive index difference being smaller than the first relative refractive index difference, wherein the optical waveguide is disposed adjacent to the second portion of the ring waveguide to optically couple with the second portion.

12. (New) The ring resonator of claim 11 wherein the second relative refractive index difference is in a range of about 0.3% to 0.75%.

13. (New) The ring resonator of claim 11 wherein the ring waveguide further comprises a first tapered portion having a first tapered waveguide width adjacent a first end of the second portion of the ring waveguide and a second tapered portion having a second tapered waveguide width adjacent a second end of the second portion of the ring waveguide.

14. (New) The ring resonator of claim 11 wherein the first relative refractive index difference is about 2.3%.

15. (New) The ring resonator of claim 11 wherein the second portion of the ring waveguide has a first propagation constant and the optical waveguide has a second propagation constant and where the first propagation constant of the second portion of the ring waveguide is approximately equal to the second propagation constant of the optical waveguide.

16. (New) The ring resonator of claim 11 wherein the optical waveguide comprises a curved portion and wherein the curved portion of the optical waveguide is disposed adjacent to the second portion of the ring waveguide to optically couple with the second portion.

17. (New) A ring resonator comprising:

a ring waveguide formed from first materials having a first relative refractive index difference between the first materials, a first portion of the ring waveguide having a first waveguide width and a first narrow portion of the ring waveguide having a second waveguide width less than the first waveguide width and a second narrow portion having a third waveguide width less than the first waveguide width;

a first optical waveguide formed from second materials having a second relative refractive index difference between the second materials, the second relative refractive index difference being less than the first relative refractive index difference, the first optical waveguide disposed adjacent to the first narrow portion of the ring waveguide to optically couple with the first narrow portion; and

a second optical waveguide formed from a third group of materials having a third relative refractive index difference,

the third relative refractive index difference being less than the first relative refractive index difference, the third optical waveguide disposed adjacent to the second narrow portion of the ring waveguide to optically couple with the second narrow portion.

18. (New) The ring resonator of claim 17 wherein each of the second and third relative refractive index differences is in a range of about 0.3% to 0.75%.

19. (New) The ring resonator of claim 17 wherein the second relative refractive index difference is approximately equal to the third relative refractive index difference.

20. (New) The ring resonator of claim 17 wherein the ring waveguide further comprises a first tapered portion having a first tapered waveguide width adjacent a first end of the first narrow portion of the ring waveguide, a second tapered portion having a second tapered waveguide width adjacent a second end of the first narrow portion of the ring waveguide, a third tapered portion having a third tapered waveguide width adjacent a first end of the second narrow portion of the ring waveguide and a fourth tapered portion having a fourth tapered waveguide width adjacent a second end of the second narrow portion of the ring waveguide.

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REMARKS/ARGUMENTS

Claims 1-7 are currently pending in this application. Claims 1, 3, 4, 6, and 7 have been amended to place them in better form for U.S. practice without additional limitations and claims 8-20 have been added to claim additional subject matter to which applicants are entitled. Applicants respectfully request entry of the present amendment and examination and allowance of this application.

Respectfully submitted,
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